

Sectional Denture for Microstomia Patient: A Clinical Report

Jayaprakash Mugur Basavanna, Amisha Raikhy

ABSTRACT

An abnormally small oral orifice is referred to as microstomia, although the intraoral structures may be of normal size. Making impression in microstomia patients is often cumbersome. Prosthetic rehabilitation of microstomia patients present difficulties at all stages, right from preliminary impressions to insertion of prostheses. To rehabilitate a patient with microstomia successfully, the methods and designs incorporated in the fabrication of prosthesis have to be modified to achieve favorable esthetics, mastication and retention. This clinical report describes the method of fabrication of sectional denture for completely edentulous patient with microstomia resulting from scleroderma with modified primary impression procedure without using tray and also method of fabricating a sectional complete denture. Fabricating the denture in two pieces enable the patient to insert and remove the denture with ease.

Keywords: Impression, Microstomia, Sectional denture.

How to cite this article: Basavanna JM, Raikhy A. Sectional Denture for Microstomia Patient: A Clinical Report. *Int J Prosthodont Restor Dent* 2013;3(2):62-67.

Source of support: Nil

Conflict of interest: None

INTRODUCTION

Microstomia is defined as an abnormally small oral orifice.¹ A limited oral opening can be caused by surgical treatment of orofacial cancers, head and neck radiation, reconstructive lip surgery, burns, trauma, microinvasion of muscles of mastication, temporomandibular joint (TMJ) dysfunction syndrome and genetic disorders.²⁻⁷

Scleroderma is a connective tissue disease of the skin, joints, and sometimes internal organs. Facial skin and oral mucosa become thin and taut, and wrinkles disappear, resulting in a mask-like appearance and a reduced oral opening.⁷ Limitation of mouth opening found in 80% of a series of patients was observed by Marmary et al.⁸ Hand deformities (Raynaud's phenomenon), along with loss of tactile sensation, make denture insertion and removal difficult.⁷

Various treatment modalities include surgery, dynamic opening devices called microstomia orthoses, and modification of denture design.⁹⁻¹³ In prosthetic treatment, the loaded impression tray is the bulkiest item requiring the intraoral placement. During impression procedures, wide mouth opening is required for proper tray insertion and alignment which is not possible in patients with restricted mouth opening. Making the impression presents the initial

difficulty in prosthetic rehabilitation in microstomia patients. Technique to make preliminary impressions for patient with constricted oral openings includes flexible modified stock trays and sectional trays.¹⁸

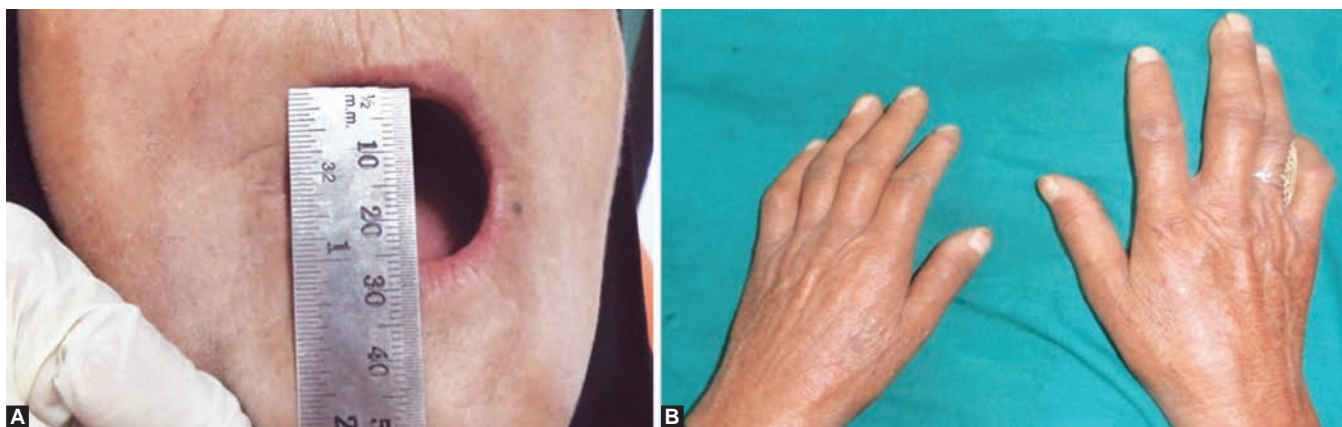
Sectional and collapsible dentures have been described for these patients. A review of the literature shows that different mechanisms for connecting sectional dentures include cast Co-Cr hinges,^{10,12} swing-lock attachments,¹⁷ stud attachments, orthodontic expansion screws,¹⁶ pins,¹¹ bolts, telescope system,¹⁷ rods,¹⁵ clasps,¹⁷ cast locking recesses and magnets.

The purpose of this clinical report is to describe the clinical management of an edentulous patient with microstomia induced by scleroderma using modified preliminary impression technique without using tray to fabricate sectional denture. The patient's low socioeconomic status demanded the simplest and least expensive dental treatment.

CLINICAL REPORT

A 55-year-old edentulous female patient with microstomia induced by scleroderma reported to the Department of Prosthodontics with the chief complaint of replacement of missing teeth. An oral examination revealed small oral aperture of 26 mm (Fig. 1A). The patient presented with typical clinical features of scleroderma such as claw-like hand and atrophy of finger tips along with loss of tactile sensation (Fig. 1B). The fabrication of complete denture is quite difficult in such patients. It was therefore decided to make modified preliminary impression without using tray to fabricate sectional denture. The loaded impression tray is the largest item requiring maximum mouth opening for proper oral placement. So it is practically not possible to make impression and fabricate denture using conventional method. Hence, it was planned to make preliminary impression using polyvinyl siloxane putty impression material reinforced with heavy gauge stainless steel wire (Fig. 2). First, the wire was contoured on the residual alveolar ridge and the impression was made. While making primary impression, wire was incorporated over the portion of silicone putty. The advantage of incorporating wire is to provide rigidity to flexible impression preventing distortion. Primary cast was poured for the fabrication of special tray.

Maxillary and mandibular sectional impression trays were fabricated using autopolymerizing acrylic resin on



Figs 1A and B: (A) Patient with restricted oral opening, (B) hand deformities.

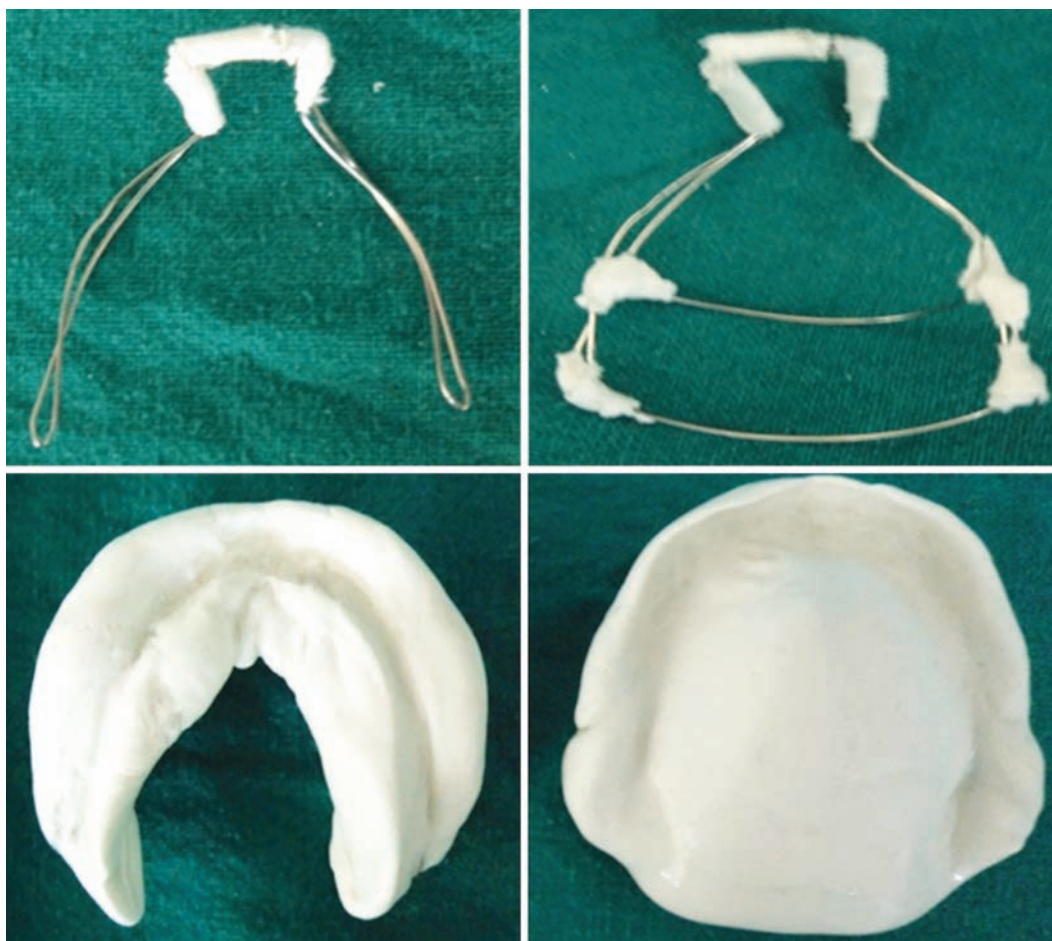
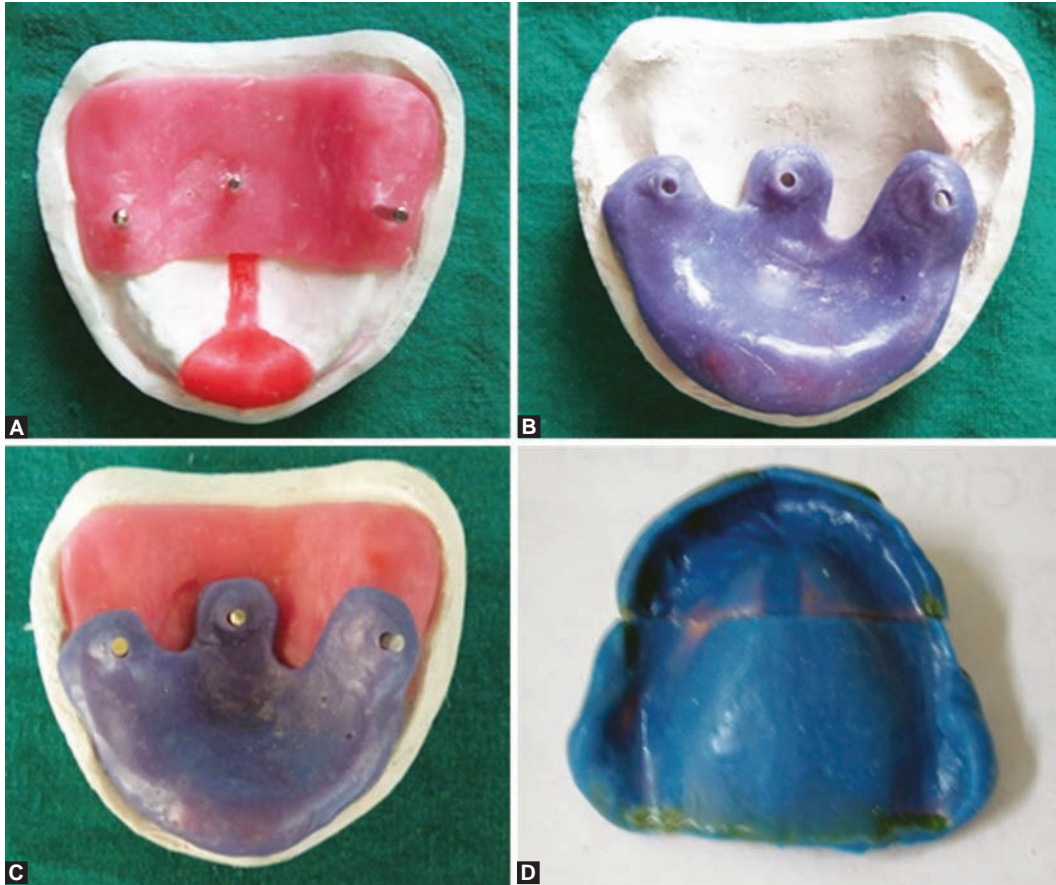


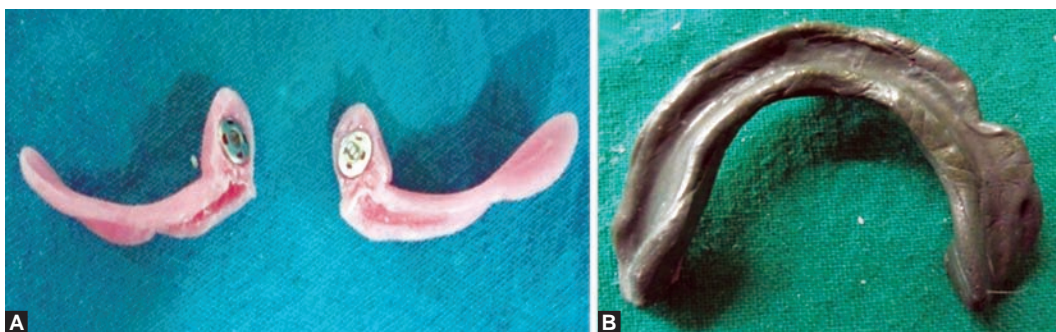
Fig. 2: Mandibular and maxillary preliminary impression

the primary cast. Maxillary custom impression tray was fabricated in two parts with anterior and posterior sections (Figs 3A to C). Three tungsten carbide metal pins of equal length of 10 mm each and 1 mm diameter were used to stabilize and realign the two parts of the tray in proper position, without any discrepancy on the ridge. The posterior section was fabricated with one metal pin placed on top of the right alveolar crest region and another on top of the left alveolar crest region of the tray (Fig. 3A). The third metal

pin was placed in the mid palatal portion of the tray. All metal pins were fixed to the tray using autopolymerizing acrylic resin and they were positioned in such a way that they are parallel to each other. The posterior section of the acrylic resin tray and the 3 metal pins were lubricated with petroleum jelly. The anterior section of the tray was fabricated using the same acrylic resin and was made to slide over the metal pins of the posterior section (Fig. 3A). The anterior section of the tray was colored to distinguish



Figs 3A to D: (A) Posterior section of custom tray with metal pins, (B) anterior section of custom tray, (C) view of complete two piece impression tray on cast, (D) maxillary final impression



Figs 4A and B: (A) Mandibular sectional custom tray with press button, (B) mandibular final impression

easily from the first tray. This was done by mixing acrylic resin with blue ink coating on the articulating paper.

Modeling plastic impression compound was used for border molding. First, posterior section of the tray was inserted intraorally, and the functional buccal vestibule and the post palatal seal areas were recorded. After posterior section, anterior section was inserted intraorally and the functional labial vestibule and frenum areas were registered. Border molding of each half of the arches was carried out separately followed by sectional final impression with polyvinyl siloxane light body elastomeric impression material. The two parts of the tray were then joined

extraorally to form a single unit (Fig. 3D) and the master cast was poured.

It was planned to make mandibular sectional impression tray having two halves, retained with press button attached to the handle of the sectional custom tray so that the trays could be exactly realigned (Fig. 4A). As the mandibular ridge was resorbed, it was decided to make mandibular final impression by McCord and Tyson technique with admix of 3 parts (red) impression compound to 7 parts of greenstick compound by weight. After the final impression was completed, the sectional trays were removed separately from the mouth and reassembled outside (Fig. 4B) and

master cast was poured. The temporary sectional maxillary denture bases retained with press buttons and foldable mandibular denture base with hinge attachment were fabricated on the master cast using autopolymerizing acrylic resin (Figs 5 and 6). On these sectional record bases, wax occlusion rims were fabricated and jaw relation was recorded by nick and notch method and denture bases were removed separately from the mouth. The transfer of jaw relation record to the articulator, arrangement of teeth, and try-in were carried out in a conventional manner (Fig. 7).

The denture was processed in sections using heat polymerized acrylic resin. Maxillary sectional denture was retained with two press buttons placed on mid of the palate and mandibular denture was retained with one lingually placed press button (Fig. 8). For both maxillary and mandibular denture, patient was instructed to place left half of dentures first into mouth followed by insertion of the right half of the dentures. The patient was thoroughly educated and instructed regarding the use of the prosthesis to ensure proper assembly. Preoperative and postoperative view of the patient is shown in Figure 9.

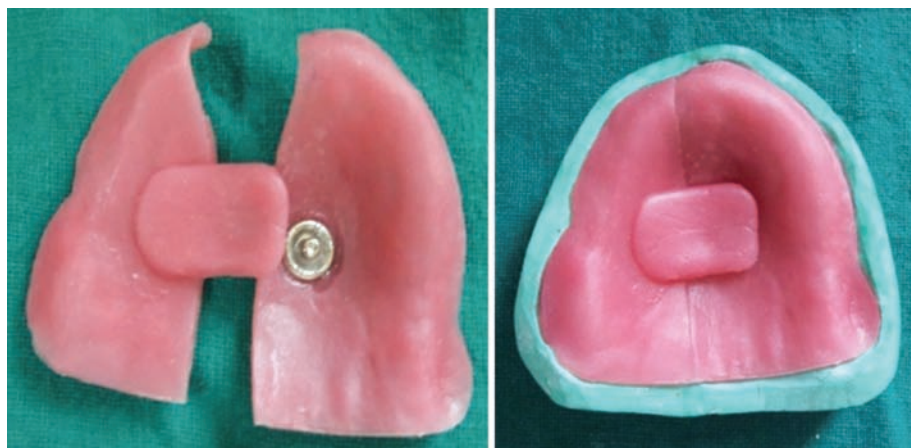


Fig. 5: Maxillary sectional denture base

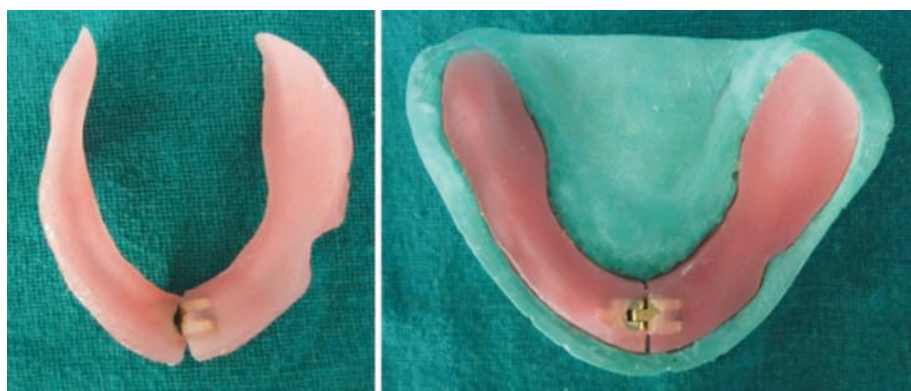


Fig. 6: Mandibular foldable denture base



Fig. 7: Mandibular foldable and maxillary sectional trail denture



Fig. 8: Sectional denture with press buttons



Fig. 9: Preoperative and postoperative view

DISCUSSION

Microstomia or limited mouth opening is common in patients suffering from scleroderma. This condition poses problem during each step of prosthetic reconstruction starting from selection of the primary impression tray to insertion of the dentures. Several methods of constructing sectional special trays have been discussed in literature. Various techniques to make preliminary impressions for patient with constricted oral openings have included, sectional stock tray system described by Robert J Luebke, flexible tray made with silicone putty and flexible tray used for fluoride application.^{14,15} In such conditions, a semirigid silicone putty impression material is commonly used as impression tray for preliminary impression. But in this case, preliminary impression made with silicone putty reinforced with stainless steel heavy gauge wire was used because it served to ease making impression by providing handle to carry the impression material and preventing distortion by giving additional support and rigidity to the flexible silicone putty impression material.

A custom sectional impression tray with two halves, allowing the functional impression to be made despite difficulties associated with microstomia. The advantage of such custom tray is that it can be removed as two separate segments and reassembled externally.

Due to limited mouth opening it is difficult to withdraw the maxillomandibular record as single unit. So after recording jaw relation both record bases were separated in patient mouth and reassemble outside. As jaw relation was recorded by nick and notch method which provides key and keyway to realign in similar position as in the patient mouth.

The present case described the fabrication of sectional prosthesis that is practical, economical and simple in design. Trayless preliminary impression and simplified sectional tray design and ease of fabrication are the major advantages of this technique. This technique was accomplished without using complicated machinery or attachment devices for sectioning or assembling the trays/prosthesis together. The press buttons are available easily and at nominal cost. In case of any damage, they can be replaced and relocated easily.

To determine the long-term success of this technique, periodic recall, maintenance and further improvements in design are needed.

SUMMARY AND CONCLUSION

This clinical report describes the fabrication of an economical, quick and easy method for fabrication of a sectional custom tray and sectional complete denture. Although patients with microstomia seeking prosthetic rehabilitation pose a challenge to the clinician, they can be conservatively managed by modifying clinical and laboratory procedures; however, in these modifications, care should be taken to avoid compromising the basic principles of providing optimum function and esthetics to the patient. The sectional denture was convenient for the patient in terms of insertion, removal and function.

REFERENCES

1. The glossary of prosthodontic terms. *J Prosthet Dent* 2005;94:10-92.
2. Dado DV, Angelats J. Upper and lower lip reconstruction using the step technique. *Ann Plast Surg* 1985;15:204-211.
3. Engelmeier RL, King GE. Complications of head and neck radiation therapy and their management. *J Prosthet Dent* 1983;49:514-522.

4. Brunello DL, Mandikos MN. The use of dynamic opening device in the treatment of radiation induced trismus. *Aust Prosthodont J* 1995;9:45-48.
5. Maragakis GM, Garcia Tempone M. Microstomia following facial burns. *J Clin Pediatric Dent* 1998;23:69-74.
6. Cohen SG, Quinn PD. Facial trismus and myofacial pain associated with infections and malignant disease. Report of five cases. *Oral Surg Oral Med Oral Path* 1998;65:538-544.
7. Gulses A. Advances in the study of genetic disorder. InTech; 2011. Chapter 22, Microstomia: a rarer but serious oral manifestation of inherited disorders. p. 450-472.
8. Marmary Y, Glaiss R, Pisanty S. Scleroderma: oral manifestations. *Oral Surg Oral Med Oral pathol* 1981;52:32-37.
9. Connie TA, Carlow DL, Stevenson-Moore P. The Vancouver microstomia orthosis. *J Prosthet Dent* 1989;61:476-483.
10. Conroy B, Reitzik M. Prosthetic restoration in microstomia. *J Prosthet Dent* 1971;26:324-327.
11. Curo C, Cotert HS, User A. Fabrication of sectional impression tray and sectional complete denture for a patient with microstomia and trismus. A clinical report. *J Prosthet Dent* 2003;89:540-543.
12. Cheng AC, Wee AG, Morrison D, Maxymiw WG. Hinged mandibular removable complete denture for post-mandibulectomy patients. *J Prosthet Dent* 1999;82:103-106.
13. Geckili O, Cilingir A, Bilgin T. Impression procedures and construction of a sectional denture for a patient with microstomia. A clinical report. *J Prosthet Dent* 2006;96:387-390.
14. Matsumura H, Kawasaki K. Magnetically connected removable sectional denture for a maxillary defect with severe undercut: a clinical report. *J Prosthet Dent* 2000;84:22-26.
15. Whitsitt JA, Battle LW. Technique for making flexible impression trays for the microstomic patient. *J Prosthet Dent* 1984;52:608-609.
16. Luebke RJ. Sectional impression tray for patients with constricted oral opening. *J Prosthet Dent* 1984;52:135-137.
17. Mirfazaelian A. Use of orthodontic expansion screw in fabricating section custom trays. *J Prosthet Dent* 2000;83:474-475.
18. Suzuki Y, Abe M, Hosoi T, Kurtz KS. Sectional collapsed denture for a partially edentulous patient with microstomia: a clinical report. *J Prosthet Dent* 2000;84:256-259.

ABOUT THE AUTHORS

Jayaprakash Muger Basavanna (Corresponding Author)

Professor and Head, Department of Prosthodontics, Teerthanker Mahaveer Dental College and Research Center, Moradabad, Uttar Pradesh, India, Phone: 05912476823, e-mail: jayaprakashmb@yahoo.com

Amisha Raikhy

Postgraduate Student, Department of Prosthodontics, Crown Implantology, Teerthanker Mahaveer Dental College and Research Center, Moradabad, Uttar Pradesh, India